

## **REMARKS**

### **The Amendments**

With this amendment, claims 1 and 19-37 are pending herein.

The claims have been amended to change British spelling to U.S. spelling. The dependency of claim 22 has been changed so that it is dependent on claim 21. Claims 25-37 have been amended to refer to “the complexing resin according to . . .” instead of “the process according to . . .”. These amendments correct clerical errors. No new matter has been added.

### **Request for Examination of Claim 22**

Since claim 22 has been made dependent on claim 21, it is respectfully submitted that this claim belongs with the group comprising claims 21 and 23-37, and it is requested that claim 22 be examined with these claims.

### **The Claim Objections**

Claims 25-37 have been objected to. The Office Action states: “These dependent claims recite ‘The process according to...’. They should recite ‘The complexing resin according to...’ so as to be consistent with the elected subject matter. Appropriate correction is required.” The claims have been amended in accordance with this suggestion.

### **The Rejection under Section 102(b) over Ballard**

Claims 19-21, and 23-37 have been rejected under 35 U.S.C. 102(b) as being anticipated by Ballard et al. (US 6,171,489). The Office Action states:

US 6,171,489 to Ballard et al. disclose and exemplify polymer beads and method for their preparation. Prior art polymer beads products are identical to those presently claimed and prepared by the identical dispersion polymerization process as used by applicant (see abstract; .col. 7, lines 11-30; working Examples). Specifically, said dispersion contains a continuous aqueous phase, an organic dispersed phase containing a functional monomer and a crosslinking monomer, magnetic particles (i.e.  $\gamma\text{-Fe}_2\text{O}_3$ ), solid dispersing agent is used in the formation of polymer beads (col. 2,

lines 50-61; col. 3, lines 25-64; col. 5, lines 1-29). Suitable crosslinking monomer, functional monomers include the presently recited amine group-containing monomers and those which can be post-reacted to form the amine functionality (col. 4, lines 5-12) are disclosed. Furthermore, backbone monomer, porogen, and stabilizing agent were taught (col. 4, lines 16-45; col. 5, lines 22-29, 50-67). Accordingly, the instant invention is anticipated in view of prior art disclosure.

This rejection is respectfully traversed. US 6,171,489 discloses a process for producing polymeric beads incorporating solid particles that may be in the form of magnetic material. The main focus of the disclosure relates to producing polymeric beads that are suitable for use as ion exchange resins. The document makes no disclosure or suggestion whatsoever of producing the polymeric beads in a form suitable for use as a complexing resin. The Examiner has specifically drawn attention to the working Examples of the '489 reference. In considering these Examples it is important to note that they all give rise to ion exchange resins, and those resins with nitrogen-based active ion exchange sites are in the form of quaternary ammonium groups, which cannot function as complexing sites. Therefore, the beads cannot be used as complexing resins.

The '489 reference also refers to the polymeric beads being treated to activate the active sites in the polymer for ion exchange. It is submitted that activation of the polymer for "ion exchange" in no way discloses or suggests that the polymeric beads are or could be treated in some other way to render them suitable for use as a complexing resin. There is no teaching whatsoever in the '489 reference that would in any way lead a person skilled in the art to prepare polymeric beads incorporating amine groups capable of complexing a transition metal cation. Accordingly, the claims of the present application are believed to be both novel and inventive in the light of this citation.

#### **The Rejection under Section 102(e) or 103(a) over Karlou-Eyrisch**

Claims 19-20 have been rejected under 35 U.S.C. 102(e) as being anticipated or obvious by Karlou-Eyrisch et al. (US 6,590,094). The office action states:

US 6,590,094 to Karlou-Eyrisch et al. discloses crosslinked polymer beads doped with superparamagnetic iron oxide (see abstract, working examples). Prior art crosslinked polymer is derived from recurring units of

amino(meth)acrylates and amino(meth)acrylamide and a crosslinking comonomer (col.2, lines 1-67). Prior art further discloses and exemplifies oil-soluble copolymer dispersing acids within the scope of the instant dispersing agent (col. 4, lines 20-59; Working Examples 1 and 2). Thus, anticipating the present claims.

The Office Action continues:

As discussed in the preceding paragraph, US 6,590,094 to Karlou-Eyrisch et al discloses crosslinked polymer beads doped with superparamagnetic iron oxide, and a copolymer dispersing aid within the scope of the present product claims. Prior art teaches various functional and crosslinking comonomers within the scope of the present claims. The instant claim 21 is presented in a product-by-process format. Thus, it is well settled that the patentability of the claimed invention is determined based on the product itself, not on the method of making it. When applicant's product and that of prior art appear to be identical or substantially identical, the burden shifts to applicant to provide evidence that the respective products do in fact differ and that the prior art product does not necessarily or inherently possess the characteristics and properties of applicant's claimed product.

These rejections are respectfully traversed. US 6,590,094 discloses a method for producing cross-linked polymeric beads doped with superparamagnetic iron oxide and containing basic amino groups. The polymeric beads are described as being suitable for use in nucleic acid diagnostics. The method disclosed for producing the polymeric beads involves first preparing the polymeric beads and then doping the polymeric beads with a metal salt that is subsequently reduced *in situ* to form the superparamagnetic particles (see for example Examples 1 and 2). By this method, it will be appreciated that magnetic particles and a dispersing agent are not used during preparation of the polymeric beads *per se*. Thus, the applicant has some doubt as to whether the resulting polymeric beads would in fact have magnetic material dispersed substantially uniformly throughout the polymeric matrix of the beads. In any event, as the method disclosed in this reference does not use a dispersing agent in the preparation of the polymeric beads, it will be appreciated that **the beads will not have a dispersing agent substantially uniformly dispersed throughout the polymeric matrix as is claimed herein.**

The Examiner's position appears to be based on the misbelief that the reference "discloses and exemplifies oil-soluble copolymer dispersing aids within the scope of the

instant dispersing agent (col. 4, lines 20-59; Working Examples I and 2)". However, the method disclosed in the reference for producing the polymeric beads involves first preparing the polymeric beads and then doping the polymeric beads with a metal salt that is subsequently reduced in situ to form the superparamagnetic particles (see at least Examples I and 2). In other words, the superparamagnetic particles are in effect introduced/formed after the polymeric beads are prepared. This method is not only inherently different from that used to prepare the polymeric beads of the present invention, but it also produces polymeric beads that are different in composition to those claimed in the present application.

In particular, the polymeric beads of the present invention comprise a polymer matrix having both magnetic particles and a dispersing agent dispersed substantially uniformly therein. The dispersing agent is located within the polymer matrix of the beads in this manner due to its role in the method of preparing the beads. Thus, the dispersing agent functions to uniformly disperse the magnetic particles within the organic phase comprising monomer that is subsequently polymerized to form the polymer matrix of the beads (see at least page 7, line 16 to page 8 line 5).

In addition to employing a dispersing agent for dispersing the magnetic particles within the organic phase, the method of producing polymer beads in accordance with the present invention may also employ a "stabilizing agent" that functions to stabilize the dispersed organic phase within the continuous aqueous phase (see page 8, lines 7-16). It will be appreciated that (1) the role of stabilizing agent is entirely different from the role of the dispersing agent, and (2) the stabilizing agent does not end up being dispersed substantially uniformly throughout the polymer matrix of the beads (i.e. the stabilizing agent in effect stabilizes the outer surface of organic phase during the formation of the polymer beads).

It is submitted that during preparation of the polymeric beads disclosed in the reference, the "oil-soluble copolymer dispersing aids" function in a similar manner to the aforementioned "stabilizing agent". This can clearly be seen from at least column 3, lines 50-52 of the reference which states that "... the activated monomer mixture is emulsified

with addition of a dispersing aid in a non-aqueous solvent to give droplets, and then the droplets which have formed are cured by raising the temperature.". In other words, dispersing aids disclosed in the reference function to stabilize the dispersed hydrophilic monomer mixture phase within the continuous non-aqueous phase. This is also borne out by the Examples.

Having appreciated the context in which "dispersing aids" are disclosed in the reference, it becomes evidently clear that the document fails to disclose or make any reference whatsoever to using a "dispersing agent" to disperse particulate matter of any type within the dispersed hydrophilic monomer mixture that is polymerized to form the polymeric beads. It therefore follows that the polymeric beads disclosed in the reference will not comprise a polymer matrix having magnetic particles and a dispersing agent dispersed substantially uniformly therein.

In contrast, the polymeric beads of complexing resin in accordance with this invention are prepared by a process comprising producing a dispersion having a continuous aqueous phase and a dispersed organic phase, the organic phase comprising one or more polymerizable monomers, magnetic particles and a dispersing agent for dispersing the magnetic particles in the organic phase. The polymerizable monomers are polymerized to form the polymeric beads that incorporate the magnetic particles and include amine groups capable of complexing a transition metal cation. The amine groups are provided by polymerized residues of the polymerizable monomers or by reaction of the polymeric beads with one or more compounds. By virtue of this process, the polymeric beads of complexing resin are advantageously provided with a polymer matrix having magnetic particles and a dispersing agent dispersed substantially uniformly therein.

Furthermore, the polymeric beads disclosed in the cited reference are said to comprise "superparamagnetic" iron oxide. Those skilled in the art will appreciate that **"superparamagnetic" iron oxide is not "magnetic" as specified in the claims hereof.**

As explained in the Wikipedia on-line encyclopedia, paramagnetism is a form of magnetism that occurs only in the presence of an externally applied magnetic field.

Normally, coupling forces in ferromagnetic materials cause the magnetic moments of neighboring atoms to align, resulting in very large internal magnetic fields. This is what distinguishes ferromagnetic materials from paramagnetic materials. At temperatures above the Curie temperature (or the Neel temperature for antiferromagnetic materials), the thermal energy is sufficient to overcome the coupling forces, causing the atomic magnetic moments to fluctuate randomly. Because there is no longer any magnetic order, the internal magnetic field no longer exists and the material exhibits paramagnetic behavior. Superparamagnetism is a phenomenon by which magnetic materials may exhibit a behavior similar to paramagnetism even when at temperatures below the Curie or the Néel temperature. **This means superparamagnetic beads are not attracted to each other in the absence of a magnetic field.**

In contrast, the "magnetic particles" described herein, as will be appreciated from at least page 7, lines 8 and 9 and page 13, lines 4 and 9 of the present application, must be capable of being magnetized so as to retain magnetic remanence (i.e. **the beads will be capable of being magnetically attracted to each other in the absence of a magnetic field**). In contrast, the polymeric beads disclosed in this reference are said to have **a low magnetic remanence** and will therefore not be attracted to each other in the absence of a magnetic field (see the first paragraph of column 3 in the reference).

Because (a) the "superparamagnetic" iron oxide referred to in the citation is not "magnetic" in the context required of the "magnetic particles" defined in the claims of the present application, and (b) the process disclosed in the reference for preparing the polymeric beads inherently excludes a dispersing agent from being uniformly dispersed throughout the polymer matrix of the polymer beads, the claims of the present application are believed to be both novel and non-obvious in the light of this document.

### **The Nonstatutory Double Patenting Rejection**

Claims 19-21 have been rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 3-4 and 6 of U.S. Patent No. 6,171,489. The Office Action alleges that "[a]lthough the conflicting claims are not identical,

they are not patentably distinct from each other because the instant claims encompass those in US-489.”

This rejection is respectfully traversed. Even if the instant claims did encompass the present claims, this would not be proper grounds for an obviousness-type double patenting rejection. See MPEP Section 804 II, which states:

Domination and double patenting should not be confused. They are two separate issues. One patent or application "dominates" a second patent or application when the first patent or application has a broad or generic claim which fully encompasses or reads on an invention defined in a narrower or more specific claim in another patent or application. Domination by itself, i.e., in the absence of statutory or nonstatutory double patenting grounds, cannot support a double patenting rejection. *In re Kaplan*, 789 F.2d 1574, 1577-78, 229 USPQ 678, 681 (Fed. Cir. 1986); and *In re Sarrett*, 327 F.2d 1005, 1014-15, 140 USPQ 474, 482 (CCPA 1964). However, the presence of domination does not preclude double patenting. See, e.g., *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968).

MPEP Section 804 II B 1(a) sets the standard for determining whether or not obviousness-type double patenting exists:

If the application at issue is the later filed application . . . a one-way determination of obviousness is needed in resolving the issue of double patenting, i.e., whether the invention defined in a claim in the application would have been anticipated by, or an obvious variation of the invention defined in a claim in the patent. See, e.g., *In re Berg*, 140 F.3d 1438, 46 USPQ2d 1226 (Fed. Cir.1998).

As discussed above in connection with the rejection under 102(b) over this reference, there is no teaching whatsoever in the '489 reference that would in any way lead a person skilled in the art to prepare polymeric beads incorporating amine groups capable of complexing a transition metal cation. Nor does any such teaching occur in the claims of the cited reference. Thus, the present claims are not obvious over the claims of this reference. Withdrawal of the double patenting rejection is therefore respectfully requested.

**The Information Disclosure Statement**

It is noted that the Examiner has initialed most of the references cited in the Information Disclosure Statement, with the exception of Corne et al. U.S. Patent No. 1190863 and a number of provisional patent applications. As the Office has access to these references in its database, it is respectfully requested that these references be reviewed and initialed.

**Request for Rejoinder**

In the event the Restriction Requirement is not withdrawn, it is respectfully requested that claim 1 be rejoined with the elected claims upon allowance of the elected claims. This is proper because claim 1 contains the novel technical feature recited in the elected claims.

**Conclusion**

In view of the foregoing arguments and amendments, withdrawal of the rejections is respectfully requested. This application appearing to be in condition for allowance, passage to issuance is also respectfully requested. It is believed no fee is due with this submission. If this is incorrect, however, please deduct the amount needed for this response, including any extension of time required, from deposit account 07-1969.

Respectfully submitted,

/ellenwinner/

Ellen P. Winner  
Reg. No. 28547

GREENLEE, WINNER AND SULLIVAN, P.C.  
4875 Pearl East Circle, Suite 200  
Boulder, CO 80301  
Telephone (303) 499-8080  
Facsimile: (303) 499-8089  
Email: [winner@greenwin.com](mailto:winner@greenwin.com)

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